EFFECTIVENESS OF TRAINING MODULE ON KNOWLEDGE AND PRACTICE REGARDING NEWBORN RESUSCITATION AND ASSESSMENT AMONG STAFF NURSES AT SELECTED HOSPITALS, CHENNAI, 2011.

DISSERTATION SUBMITTED TO

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CHAPTER – I

INTRODUCTION

WE MUST COUNT NEWBORN DEATHS AND MAKE THEM COUNT, INSTEAD OF ACCEPTING THESE DEATHS AS INEVITABLE.

FRANCISCO SONGANE

BACKGROUND OF THE STUDY

Newborns are considered to be tiny and powerless beings, completely dependent on others for their adaptation in the external environment. Every infant presents uniquely and has certain individual needs. While the vast majority of infants transition without problems, some present with anatomical, physiological, infectious and developmental issues that must be addressed.

Newborn period is from the time of birth to 28 days of life. Approximately 85% to 90% of infants make the transition from intrauterine to extra uterine life with no assistance necessary. However, for the remaining few newborns, some assistance may be required, ranging from simple stimulation to complete resuscitation.

The majority of all neonatal deaths (75%) occur during the first week of life. Of those deaths, between 25% and 45% occur within the first 24 hours. Further, the neonatal period which comprises of the first 28 days of life accounts for 37% of all deaths among children under five. **(WHO 2009)**[94]

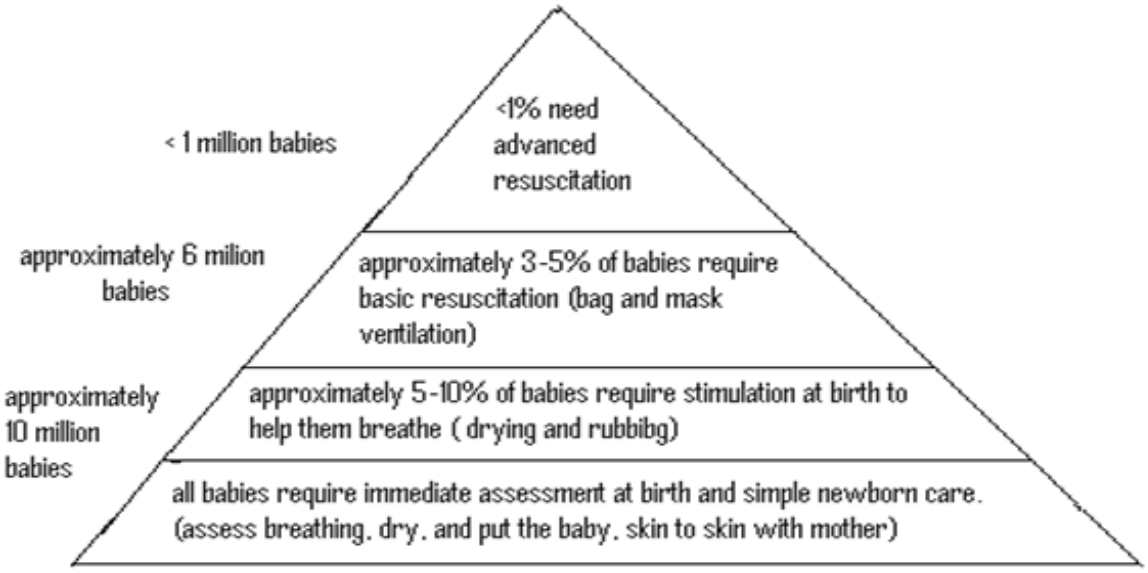
The most physiological change that takes place in the neonate is transition from fetal circulation to independent survival. The newborn needs adequate support to initiate breathing and maintain thermoregulation. Newborn resuscitation is done in order to establish breathing and ensure survival of the newborn.

Perinatal asphyxia and extreme prematurity are the two complications of pregnancy that most frequently require a complex resuscitation by skilled personnel. 80% of low birth weight infants require resuscitation and stabilization at delivery. Effective management of asphyxia in the first few minutes of life may influence long term outcome. Birth injuries and prolonged effort time are also the causes, in which the newborn needs resuscitation.

Newborn resuscitation is a complex procedure that requires the use of specialized knowledge and skills in an emotionally charged and stressful situation. Knowledge about newborn resuscitation, frequent performance of skills and comfort level with skill performance are dimensions of quality implementation of newborn resuscitation.

Newborn resuscitation is a series of action that are taken in order to revive an infant immediately after birth so that normal respiration and circulation may be initiated and maintained. It is an attempt to facilitate the dynamic transition from fetal to neonatal physiology.

The initiation of breathing is critical in the physiologic transition from intrauterine to extra uterine life. Between 5-10% of all newborns require assistance to establish breathing at birth, and simple warming, drying, stimulation and resuscitation may reduce neonatal mortality and morbidity rate. Each year an estimated 814,000 deaths are related to intra partum hypoxic events. (**UNICEF 2011)**[95]



Figure(1) Estimate of annual number of all newborn who require assistance to breathe at birth and varying levels of newborn resuscitation.

International committee on resuscitation has developed recommendations in the newborn resuscitation which says that at least one person trained in resuscitation of the newborn should attend every delivery. **(Johannson A.N. Biarent D.2002)**[55]

A study was conducted in level II perinatal centers in central east region of Ontario, to evaluate the impact of newborn resuscitation course on the knowledge and practical skills among 737 medical staffs, nurses and respiratory technologists who worked in birthing rooms. A cohort of 108(15%) participants received testing before and after the course, the knowledge and practical performance of 62 of these participants were retested after 6 months. Results showed that there was a significant improvement in both knowledge and practical skills immediately after the course. The study concluded that newborn resuscitation should be an integral part of continuing education for all personnel involved in neonatal care because it improves both knowledge and performance. **(Britton J.R. 2008)**[40]

Newborn accounts for a large proportion of child deaths. The first 24 hours of life are considered to be dangerous. The neonatal mortality rate is considered to be one of the best means of determining the health of a country.

Neonatal mortality rate accounts for more than half the infant mortality (95/1000 live births). In India it is 3-4 times than in the western countries.

Each year, about 4 million newborn die before they are 4 week old. 98% of these deaths occur in developing countries. Newborn deaths now contribute to about 40% of all deaths in children under-five of age globally more than half of infant mortality. Rates are highest in sub-Saharan Africa and Asia. 2/3rd of newborn death occurs in Africa (28%) and South- East Asia (36%).

In India neonatal mortality rate estimated in the year 2006 is about 25 per 1000 live birth in early neonatal period rate for the whole country is about 37/1000 live births.

In India, perinatal asphyxia is one of the common causes of neonatal mortality. Data from National Neonatal Perinatal database suggest that perinatal asphyxia contributes to almost 20% of neonatal deaths. The other causes of neonatal mortality are low birth weight, atelectasis, birth injuries, congenital malformation and infections. **(WHO 2010)**[94]

Newborn assessment refers to the head to toe examination of infant at the time of birth. A thorough neonatal assessment should be performed on newborns in the first hours after birth to ensure an appropriate transition to extra uterine life. Conducting a thorough neonatal assessment is necessary to ensure that the newborn transitions appropriately to extra-uterine life. Skilled observation should begin at the time of birth and continue frequently during the first 24 hours. Nurses should be aware of the normal features of the transition period in order to detect disorders in adaptation soon after birth. The newborn assessment provides much needed

information concerning the state of health of the transitioning newborn as well as a basis with which to formulate further care.

The assessment of the newborn should begin with obtaining a health history and include the initial Apgar assessment, transitional assessment during the periods of reactivity, assessment of gestational age, and a physical examination. This systematic approach ensures a thorough exam.

NEED FOR THE STUDY

Newborn may encounter difficulty before labor, during labor or after birth. Problems encountered during birth are more likely to involve babies' airway and disrupt normal transitions.

About 6% of newborns require resuscitation at delivery, the incidence increases significantly if birth weight is <1500g. It is estimated that potentially, 800,000 newborns can be saved each year by simple airway maneuvers. Personnel trained in basic resuscitation should be present at all deliveries and personnel trained in advanced resuscitation should be present at deliveries with known risk factors.

Newborn resuscitation skills are essential for all health care providers who are involved in the delivery of newborn. Every birth the nurse should be prepared to resuscitate a newborn because the need for resuscitation will be necessary for each newborn. Every birth should be attended by at least one person skilled in neonatal resuscitation.

In newborns a rate of 3:1 is recommended unless a cardiac cause is known in which case a 15:2 ratio is reasonable. **(American Heart Association and International Liaison Committee. 2010)**[96]

Newborn resuscitation class is important for nurses because it helps the nurses to correctly respond to emergency situations with the needed skills that will ultimately saves lives.

Newborn Resuscitation: the golden minute, states that delivering a new life into the world is truly a unique and proud moment. All health care providers need to allocate time for review and improvement in the knowledge, skills and attitudes required to conduct a major resuscitation. **(Tomek.S. 2011)**[113]

The long term outcome of infants subjected to perinatal asphyxia can be improved if they are recognized as high risk before birth and managed so as to reduce the period of hypoxemia to a minimum. He further states that prompt and effective resuscitation of asphyxiated babies at the time of birth can contribute much to improving to long term outcomes of these infants. **(Poland .R .2011)**[109]

A study was conducted on resuscitation performance via means of video recording; they found that 54% of resuscitation deviated from the standardized neonatal resuscitation program guidelines. They suggested that reinforcement of the knowledge and practice should be continued for the health professionals. (**Carbine et al .2000)**[41]

The joint accreditation commission of health care organization requested that all the hospital nursing staffs, respiratory therapist, anesthetist, emergency medical personnel be trained in basic resuscitation.

The article on “Neonatal resuscitation in the ward: the role of nurses “states that newborn resuscitation is necessary in about 1-2% of all newly born infants in their first minutes of life. In all these scenarios, the role of nurses is essential for several aspects, including early recognition of a deteriorating infant, with the aim to prevent cardiac arrest, as well as the starting of immediate basic life support at the

bedside. Furthermore, nurses have a special part in family care during newborn resuscitation. **(Biban P, Soffiati M 2009)**[38]

Globally, ten million or more newborns worldwide each year need some type of resuscitation assistance. More than 1 million babies die annually from complications of birth asphyxia. The most widely used curriculum is the Neonatal Resuscitation Program, which is supported by the American Academy of Pediatrics and the American Heart Association. To date more than 1.5 million individuals have been trained in the Neonatal Resuscitation Program.

With the growing complexity of health sciences, the health professional require more knowledge and skills to resuscitate newborn and to assess newborn to prevent future complications in the newborns life.

The investigator's personal experience of working in labour room felt that nurses need to wait for neonatologist for resuscitation. Training module on newborn resuscitation and assessment according to current guidelines will help nurses to perform initial resuscitation steps and immediate assessment, so that early neonatal complications can be prevented. As the investigator is specializing in the field of child health nursing, felt the need and was motivated to reinforce the knowledge and practical skills on newborn resuscitation and assessment, which was based on revised newborn resuscitation guidelines 2010.

STATEMENT OF THE PROBLEM

A quasi experimental study to assess the effectiveness of training module on knowledge and practice regarding newborn resuscitation and assessment among staff nurses working at selected hospitals, Chennai.

OBJECTIVES

1. To assess the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.

2. To compare the post intervention level of knowledge and practice on newborn resuscitation and assessment between staff nurses in Group A and Group B.
3. To correlate the post intervention level of knowledge with practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.
4. To associate the knowledge and practice scores on newborn resuscitation and assessment with selected demographic variables of staff nurses in Group A and Group B.

OPERATIONAL DEFINITION

Effectiveness

Refers to the outcomes or results in terms of knowledge and practice after administering training module regarding newborn resuscitation and assessment which will be assessed by using structured questionnaire devised by the investigator and observational checklist based on modified AAP and WHO guidelines respectively.

Training Module

It is the set of interventions prepared by the investigator for the staff nurses regarding newborn resuscitation and assessment by lecture cum demonstration and booklet which was reinforced through video show and return demonstration.

Knowledge

Refers to an understanding and ability of the staff nurses to answer questions regarding newborn resuscitation and assessment which was assessed using structured knowledge questionnaire which includes 2 components

A. **Newborn resuscitation**

i) Meaning of resuscitation.

ii) Initial steps in resuscitation

iii) Bag / mask ventilation.

iv) Chest compression.

v) Medication.

B. **Newborn assessment**

i) Immediate newborn assessment.

ii) Transitional assessment

Which includes

- Anthropometric measurement
- Vital signs
- Assessment of gestational age
- Physical examination
- Assessment of reflexes
- Behavioral assessment

Practice

Refers to the ability of staff nurses to perform the initial steps in newborn resuscitation which includes establishing airway, suctioning, drying and monitoring heart rate and respiration and complete newborn assessment which includes checking Apgar score, anthropometric measurements, head to toe assessment, checking the reflexes and behavioral status and is evaluated by observational checklist based on modified AAP and WHO guidelines respectively.

Newborn Resuscitation

Refers to immediate care given to the newborn which includes establishing airway, initiating breathing, maintaining circulation and evaluation of newborn for adequacy of respiration and heart rate.

Assessment

Refers to the head to toe examination of infant at the time of birth performed by staff nurses.

Staff Nurses

Refers to registered nurses working in labor room, postnatal unit and NICU of selected hospitals.

ASSUMPTIONS

1. Staff nurses may have some knowledge and practice on newborn resuscitation and assessment.
2. Imparting information on newborn resuscitation and assessment may enhance level of knowledge and practice among staff nurses.
3. Adequate information regarding newborn resuscitation and assessment provided to the staff nurses may help to provide expertise care for newborn.
4. Providing information regarding newborn resuscitation and assessment may enhance the standards of nursing practice.

NULL HYPOTHESES

NH_1: There is no significant difference between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in the Group A and Group B at $p<0.001$.

NH_2: There is no significant correlation between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in the Group A and Group B at $p<0.001$.

NH_3: There is no significant association between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses with the selected demographic variables in the Group A and Group B at $p<0.001$.

DELIMITATION

The study was delimited to the period of 4 weeks.

CONCEPTUAL FRAMEWORK

A conceptual framework or a model is made up of concepts, which are the mental images of the phenomena. A conceptual framework provides the guidelines to attain the objectives of the study based on the theory. It is the schematic representation of activities, steps and action of the study. A conceptual framework is used in research to outline the possible course of action to present a preferred approach to an idea or thought.

In view of explaining and relating various concept of the study regarding training module on newborn resuscitation and assessment, the investigator has adopted **Hildegard Peplau's interpersonal relations model to** conceptualize the research study.

Hildegard Peplau a nurse theorist developed the first conceptual curriculum for the Bachelor of Science in nursing program and proposed interpersonal theory, which describes the interpersonal process and therapeutic relationship as the ways to attain goal. For this the nurse plays various roles such as teacher, resource person, counselor, leader and a technical expert.

In this study, the investigator act as a teacher, resource person and a leader in teaching the training module on newborn resuscitation and assessment. To achieve this goal, the investigator maintains interpersonal process and establishes mutual relationship.

The four phases in Peplau's interpersonal model are:

1. Orientation phase
2. Identification phase
3. Exploitation phase
4. Resolution phase

ORIENTATION AND IDENTIFICATION PHASE

In this study, the investigator has conceptualized the **Orientation phase and Identification phase** in which the nurse investigator and the staff nurses (with demographic variables such as age, educational qualification, years of experience, number of times each procedures performed, any previous training programmes attended) meets each other, establishes good interpersonal relations and identifies the felt need.

EXPLOITATION PHASE

In the **Exploitation phase,** the nurse investigator and the staff nurses together set the new goal which leads to attainment of the need. In this study, the exploitation phase refers to introduction of training module - lecture cum demonstration, booklet, video show and return demonstration regarding newborn resuscitation (based on current newborn resuscitation guidelines 2010) and assessment by the nurse investigator to the staff nurses.

RESOLUTION PHASE

In the **Resolution phase,** the nurses need have been met by the collaborative efforts of the nurse investigator and staff nurses. In this study, during the **Resolution phase,** the post test assessment of Knowledge was done by structured questionnaire and the assessment of post test practice was done by observational check list which was based on AAP& WHO guidelines. The achievement of the goal or need was indicated by positive outcome, that is attainment of adequate knowledge and good practice regarding newborn resuscitation and assessment which may be enhanced and negative outcome is indicated by the inadequate knowledge and poor practice regarding newborn resuscitation and assessment, which may be reassessed and reinforced by further teaching.

OUTLINE OF THE REPORT

CHAPTER I : This chapter dealt with the back ground of the study, need for the study, statement of the problem, objectives, operational definitions, null hypotheses, assumptions, delimitations and conceptual frame work.

CHAPTER II : Focuses on review of literature related to the present study.

CHAPTER III : Enumerates the methodology of the study.

CHAPTER IV : Presents the data analysis and data interpretation.

CHAPTER V : Deals with the discussion of the study

CHAPTER VI : Gives the summary, conclusion, implications, recommendations and limitations of the study.

The study report ends with selected Bibliography and Appendices.

CHAPTER – II

REVIEW OF LITERATURE

This chapter deals with the related literature review which aids to generate a picture of what is known and not known about a particular situation.

According to Geri LoBiondo-Wood., et al. (2006) review of literature is an organized critique of important scholarly literature which supports a study and a key step in research process.

An extensive review of literature was done by the investigator to gain an insight into the problem, collect maximum information from systematic and critical review of scholarly publications, unpublished scholarly print materials. The logical sequence of the chapter is organized in the following sections:

Section-A: Literature related to knowledge and practice of newborn resuscitation

Section-B: Literature related to knowledge and practice of newborn assessment

SECTION-A: LITERATURE RELATED TO KNOWLEDGE AND PRACTICE OF NEWBORN RESUSCITATION

Matendo, R.,et al.(2011)[65] conducted a secondary analysis on the effect of training of newborn resuscitation program among traditional birth attendants and midwives in Democratic Republic of Congo. The study revealed that training midwives and birth attendants reduces perinatal mortality. There was a gradual but significant decline in perinatal mortality during the year following newborn resuscitation program training.

Kalmbach, K.(2011)[105] in his article on newborn resuscitation states that, successful resuscitation of newborn infants depends on adequate preparation, exact evaluation and prompt initiation of support by trained personnel's, especially by the health care professionals. In compromised newborn infants, adequate ventilation is the most important step in newborn resuscitation. The prevention of heat loss and maintaining a normal body temperature by adequate measures is an essential part of the care of newborn.

Goudar, S.S.,et al. (2011)[51] conducted a community based cluster randomized controlled trail, to evaluate the effect of American Academy of Pediatrics, Newborn resuscitation program training on perinatal mortality in rural India. After the Newborn Resuscitation Program training, early neonatal mortality decreased from 29 to 22/1000. The study concluded that in low resource settings, the newborn resuscitation training package appears to be an effective intervention to decrease perinatal mortality.

Rovamo, L., et al. (2011)[77] conducted an observational cohort study, on education of nurses according to Newborn resuscitation program guidelines improves outcome of delivery room in a children's hospital at Finland. A 30 item checklist was used for scoring the skills. The study results showed that there was a significant improvement in skill in nurses, and also stressed that a regular assessment of skills are important for reliable performance of newborn resuscitation.

Nelson, C.A., et al. (2011)[67] conducted a pre-experimental study to quantify newborn resuscitation capacity at birthing sites in urban and rural Nepal among health care workers. Assessments included standardized interviews and evaluation of newborn resuscitation areas. The availability of essential resuscitation tools was recorded. The study results showed that, there was a improvement in skill and knowledge, only when caregivers have proper training and access to essential supplies.

Anne, cc.lee., et al. (2011)[34] conducted a systematic review and Delphi estimation of mortality effect on neonatal resuscitation and immediate newborn assessment among 136 million babies born annually, the study revealed that around 10 million require assistance to breathe and each year 814,000 neonatal deaths result from complications of prematurity. Delphi panel of 18 experts estimated that immediate newborn assessment would reduce intrapartum and preterm deaths by 10%, resuscitation could prevent 10% of preterm deaths. The study concluded that newborn resuscitation training reduces term intrapartum deaths by 30%.

Laurel Bookman & Cyril Engmann. (2010)[62] conducted a study to assess the baseline cognitive knowledge of evidence based newborn resuscitation practices and short and long term education effects of teaching on newborn resuscitation program among midwives in West Africa. All midwives on the labour ward were trained using materials modified from the American Academy of Pediatrics Newborn resuscitation program. Written and practical modules 9-12 months after the initial training session were also conducted to assess retention of knowledge and skills. The study concluded that after receiving newborn resuscitation program training, knowledge and skills increased among midwives and were sustained over a 9 month period.

Topyian, A.A., et al. (2010)[84] in his article **"**Resuscitation training in developing countries**"**, states that increased child survival after resuscitation training was variable, with an absolute risk reduction that ranges from 0% - 34%. He further says that institution of training in trauma and newborn resuscitation in developing countries has significantly improved the knowledge and practice of health care professionals by reducing the mortality rate.

Jukkala, A.M., & Henly, S.J. (2009)[56] conducted a correlational study on provider readiness for newborn resuscitation among nurses and physician working in 26 rural hospitals, USA. The samples were 165 nurses and 59 physicians. Correlation between frequency of skill performance and comfort was higher for

nurses than physicians. The study concluded that nurses who were current newborn resuscitation program providers had significantly higher average levels of comfort. (3.67 vs. 3.11; $p<0.01$), knowledge (72.18 vs. 60.71; $p<0.01$) and experience (0.94 vs. 0.51; $p<0.01$)

Iriondo, M., et al. (2009)[53] conducted a survey of newborn resuscitation in Spain : gaps between guidelines and practice among delivery room nurses of Spanish hospitals. A questionnaire type survey on newborn resuscitation equipment and practices was performed. The study concluded that performance during resuscitation and transportation is significantly greater acquaintance with internationally recommended newborn resuscitation guidelines.

Zaeem-ul-Haq., et al.(2009)[92] conducted a postal survey on evidence for improvement in the quality of care given during emergencies in infancy and childhood, among doctors and nurses from public sector hospitals in Islamabad. 90% of the respondents reported the use of acquired skills and the structured airway, breathing and circulation approach in handling emergencies. The study concluded that the introduction of a structured training program in a resource-constrained health care system has improved the emergency management of children.

Zafar, S., et al. (2009)[93] conducted a cross – sectional survey on to evaluate the use of structured training program in emergency care among 120 health workers in all regions of Pakistan. 1123 resuscitation attempts were documented and received from 63 of the 120 participants. 24% of documented cases were received from nurses. Skills used to serve the airway; breathing and circulation were used in 58%, 82%, and 73% of resuscitated children. The study concluded that, the analysis provided some evidence that the skills taught are used by the trained health workers and their practice is significantly improved.

Carlo, W.A., et al. (2009)[43] conducted a pre-experimental study to evaluate the effectiveness of American Academy of Pediatrics Newborn Resuscitation Program in improving knowledge, skills and self-efficacy among 127 nurses working in low risk delivery clinics in USA. After training, written scores improved from 57% to 80%, performance scores improved from 74% to 90%. The study revealed that newborn resuscitation program training has the potential to substantially improve knowledge and skills of newborn resuscitation.

Berger, T.M., & Pilgrims. (2009)[37] in his article on Resuscitation of Newborn Infants stated that although almost 10% of all newborn infants need some form of respiratory assistance after birth, only 1% will require more advanced forms of resuscitation. Because these rare events can't be always anticipated, pediatricians and neonatologists may not be readily available and resuscitation will have to be performed by nurses.

Alexandra Osafo & Carl Bose. (2009)[31] conducted a study to evaluate the effectiveness of a strategy for teaching newborn resuscitation on health professionals at Ghana, West Africa. The median pretest and post test scores were 43% and 81% for nurses, 52% and 90% for nurse anesthetists. All groups of 271 professionals who completed the course showed significant improvement ($p<0.001$) in median post test scores. The study concluded that evidence based newborn resuscitation training adapted significantly improved knowledge of all groups of health professionals.

Surg Cdr S & Narayan., et al. (2009)[82] conducted a one group pre test and post test design to evaluate the effectiveness of teaching of newborn resuscitation for 35 medical personnel including nursing officers and probationer nurses. The mean pre test score was 9.03 which improved to a mean of 15.53 in post test. This improvement was highly significant with $p<0.001$. Sub group analysis revealed that nursing officers and probationer nurses showed highly significant improvement in the post test score.

Britton, J.R. (2008)[40] conducted a study in level II perinatal centers in central east region of Ontario, to evaluate the impact of newborn resuscitation course on the knowledge and practical skills among 737 medical staffs, nurses and respiratory technologists who worked in birthing rooms. A cohort of 108(15%) participants received testing before and after the course, the knowledge and practical performance of 62 of these participants were retested after 6 months. Results showed that there was a significant improvement in both knowledge and practical skills immediately after the course. The study concluded that newborn resuscitation should be an integral part of continuing education for all personnel involved in neonatal care because it improves both knowledge and performance. In service instruction is required at least every six months.

Bream, K.D. (2005)[39] conducted a study to assess barriers to and facilitators for newborn resuscitation among obstetric nurses in a central hospital in Malawi. The study concluded that solution to barriers included small resources additions as well as long term policy changes. With standard policy and protocols, experienced confident nurse could overcome the barriers in providing newborn resuscitation so that it can reduce infant mortality and improve the health and quality of life of women receiving care in Malawi.

Durojaive, L.O. & Meara, M. (2004)[48] conducted a study on improvement in resuscitation knowledge after a one day pediatric life support course among staff nurses in Sydney hospital. Responses to individual questions before and after course were analyzed and an overall test score was calculated. The result showed that there was a significant improvement in the knowledge of the group after the course with median test score increasing from 19 to a maximum of 22($P<0.001$)

Mc.Namara, P.J. (2002)[66] conducted a comparative study on resuscitation and stabilization of premature infants when specialized neonatal retrieval team is in attendance at delivery with immediate resuscitation and stabilization performed by the referral hospital team. Results showed that the presence of highly skilled

transport team at a high risk preterm delivery improves the quality of newborn resuscitation.

Patel, D. (2001)[73] conducted a retrospective three time period cohort design study on effect of a state wide neonatal resuscitation training program on Apgar scores among high risk neonates in IIinois. The result showed significant improvement occurred among neonates in their Apgar score after neonatal resuscitation program instruction in IIinois.

Vakrilova, L. (2001)[87] in his article states that French Bulgarian program of 'resuscitation of newborn in a delivery room' results and perspectives that the main goal of this program is to reduce the neonatal mortality rate due to perinatal and intranatal asphyxia and their consequences. This was achieved by providing the delivery rooms of city hospital with resuscitation equipments and improving the qualification of the personnel like nurses, and neonatologist, keeping the resuscitation equipment always ready for action.

Ravanca. (2000)[77] conducted a prospective controlled observational study on the effect of structured newborn resuscitation program among 33 nurses and 11 pediatric resident physicians at Irish maternity hospital. The purpose of the study was to find out the effectiveness of neonatal resuscitation program of the American Academy of Pediatrics. The result showed that there was a significant improvement in the delivery room preparation, thermal protection and evaluation to the infant.

SECTION-B: LITERATURE RELATED TO KNOWLEDGE AND PRACTICE ON NEWBORN ASSESSMENT

Amal Mohammed El-Dakhakhny. (2011)[33] conducted a quasi experimental study to evaluate the impact of educational program on newborn assessment among 60 nurses in maternal and child health units at Zagazig city, Egypt. A structured interview sheet and observational checklist were used to assess nurses performance. It was found that total nurse's complete knowledge and

practice score was poor before program implementation and improved at post test ant this result was highly significant. The study concluded that the nurse's performance significantly improves after program implementation.

Dalia Rahmi Toqan & Asma Imam. (2011)[47] conducted a descriptive study to assess the level of standards of quality care and performance among 84 neonatal nurses working in seven governmental hospitals in west bank of Palestine. It was found that there is a relationship between quality of care and performance of nurses in NICU. Therefore it is important to assess the nurse's performance. The result of this study showed that the overall level of application of standards of quality care was moderate in newborn assessment.

Ariff , S. Soofi, S.B. (2010)[35] conducted a needs assessment analysis on knowledge and practice of maternal and neonatal care among health care providers in the public sector of Pakistan. The nurses knowledge was good with 30% scoring more than 70% and 50% were able to demonstrate steps of immediate newborn care. The study revealed that periodic training of health workers is very vital to address the gaps and to develop continuing education modules.

George Little & Susan Niermeyer, M.D. (2010)[63] conducted studies on neonatal care among nurses in Zambia. The results showed that 71,689 infants born indicated that an education program focused on thermal protection, newborn resuscitation, and skin to skin care with the mother and initial management and assessment effectively lowered the early neonatal mortality rate from 11.5 to 6.8 in 1000 live births.

Clark & Hakanson. (2008)[46] conducted a study to compare the consistency of Apgar scoring among various health care disciplines in Europe. Health care providers were visually shown case presentations and then asked to assign Apgar scores to the infants. The study revealed that intensive care nursery staff had a

score of 42%, obstetric nurses 36% and community hospital nurses had a consistency rating of 24%.

Newton opiyo., et al. (2008)[71] conducted a randomized controlled trail to assess the effect of newborn assessment training among nurses in Kenya. Data were collected on 97 nurses over 7 weeks after early training in the intervention and control groups. Trained nurses demonstrated a higher proportion compared to control group, (trained-66%, control-27%). The study concluded that a simple newborn reflexes training shows a significant improvement in health workers practice.

Upul Senarath & Ishani Rodrigo. (2007)[86] conducted a before and after study with an intervention and control group on to evaluate the effectiveness of a training program in improving practice of newborn care among nurses and midwives, working in 2 hospitals in the Puttalam district in Srilanka. A 4 day training program on newborn care was given. Practices of thermal protection, neonatal assessment improved significantly in the intervention group. Undesirable health events declined from 32 to 21 newborn in the intervention group, and from 20 to 17 newborn in the control group. The results showed that there was a significant improvement in the newborn care practices in obstetric units in the intervention group three months after the 4 day training program.

Elizabeth, M., Mcclure., et al. (2005)[49] conducted a pre-experimental study to evaluate the educational impact of newborn care among 115 nurses in Global network for women and children health research, Zambia. The post test score for knowledge was increased to 89% from 68% and practice was increased to 81% from 65% where $p<0.05$. The study concluded that there is significant improvement of knowledge and practice after essential newborn care training.

Townsend, J., et al. (2004)[85] conducted a prospective randomized controlled trail to assess the implications of extending the role of nurses to include

the 24 hour examination of the healthy newborn among midwives working in a district general hospital, London. The intervention consists of a routine examination of newborn at about 24 hours from birth by the trained professionals. Videoed assessments were assessed as carried out more appropriately by the midwives. The study concluded that developing the role of midwife to include examination of the newborn is likely to result in improved quality of examination and higher satisfaction from mothers.

Karaca saydam & sirin. (2002)[58] conducted a experimental study on the effectiveness of the teaching course about newborn's Apgar score among nurses working at Konak gynecology and obstetrical hospital in Turkey. The mean knowledge level related to Apgar score in the pre and post test are evaluated and the mean points are increased from 19.33 to 221.70. The distribution of the Apgar score practice pre and post teaching was 31.2% and 52.4% respectively. The study concluded that there was a significant improvement in knowledge and practice of nurses but continued and regular teaching courses are more important for obtaining an effective and standard performance.

CHAPTER – III

RESEARCH METHODOLOGY

This chapter describes the methodology adopted in this study to assess the effectiveness of training module on knowledge and practice regarding newborn resuscitation and assessment among staff nurses at selected hospitals.

It includes the research design, variables, setting of the study, population of the study, sample size, sampling technique, criteria for selection of samples, description of the tool, procedure for data collection and plan for data analysis.

RESEARCH APPROACH

The research approach used for this study was Quantitative research approach.

RESEARCH DESIGN

The research design used for this study was quasi experimental non equivalent control group post test only design. Based on **Polit and Hungler, (2011)**[22] the framework for the study was done as:

GROUP	INTERVENTION (x)	POST TEST(0)
Group A	Administration of training module on newborn resuscitation and assessment in the form of lecture cum demonstration, booklet and reinforcing through video show and return demonstration	Assessment of knowledge by structured questionnaire and Assessment of practice by observational checklist based on modified AAP & WHO guidelines
Group B	Inservice education classes were attended by all staff nurses on every Saturdays.	Assessment of knowledge by structured questionnaire and Assessment of practice by observational checklist based on modified AAP & WHO guidelines

VARIABLES

Independent Variables

The independent variable for the present study was training module on newborn resuscitation and assessment.

Dependent Variables

The dependent variables in the present study were Knowledge and practice among staff nurses.

Extraneous Variables

The extraneous variables in the present study were age, educational qualification, years of experience, number of times each procedures performed, any previous training programmes attended.

SETTING

The research setting includes Madras Medical Mission, Moggapair – 250 bedded hospitals and Public Health Center, Mambalam – 200 bedded hospitals. Staff nurses working in Public Health Center, were taken as Group A and staff nurses working in Madras Medical Mission were taken as Group B.

POPULATION

Target Population

All staff nurses working in labour room, postnatal unit and NICU of Madras Medical Mission, Moggapair and Public Health Center, Mambalam.

Accessible Population

The study population comprised of 80 staff nurses working in labor room, postnatal unit and NICU of Madras Medical Mission, Moggapair and Public Health Center, Mambalam.

SAMPLE

The study sample consists of 60 staff nurses working in the selected hospitals, who fulfilled the inclusive criteria. Among 60 nurses, 30 staff nurses were in Group A and 30 staff nurses were in Group B.

SAMPLING TECHNIQUE

Non probability convenient sampling technique was used for the present study.

CRITERIA FOR SAMPLE SELECTION

Inclusive Criteria

1. Nurses working in labor room, postnatal unit and NICU.
2. Nurses with the educational qualification of ANM, Dip in nursing, B.Sc. Nursing, PC B.Sc.Nursing
3. Nurses caring for newborn on the day of birth.
4. Nurses working in morning and evening shifts from 7am to 8pm.

Exclusive criteria

1. Nurses who are not willing to participate in the study.

DEVELOPMENT AND DESCRIPTION OF THE TOOL

The tool for the data collection consisted of 4 sections

SECTION - A

Demographic variables which include age, educational qualification, and years of experience in nursing, number of times each procedures was performed, any previous training programmes attended.

SECTION - B

The intervention tool consisted of lecture cum demonstration, booklet and video show regarding

- New born resuscitation.
- New born assessment.

Newborn Resuscitation

- Meaning of resuscitation
- Initial steps in resuscitation
- Bag/mask ventilation
- Chest compression
- Medication

Newborn Assessment

- Initial assessment
- Transtitional assessment
- Anthropometric measurement
- Vital signs
- Assessment of gestational age
- Physical examination
- Assessment of reflexes
- Behavioral assessment

SECTION - C

A structured questionnaire to assess the knowledge of nurses. The questionnaire consisted of 40 multiple choice questions under separate subheading as follows:

S.No.	Items	No. of questions
1-25	1. New born resuscitation	25
1-5	• Meaning	5
6-10	• Initial steps of resuscitation	5
11-15	• Bag/mask ventilation	5
16-20	• Chest compression	5
21-25	• Medication	5
1-15	2. New born assessment	15
1-5	• Immediate assessment	5
6-15	• Transitional assessment	10

Scoring Key

Correct answer	-	1 mark
Wrong answer	-	0 mark
Total mark	-	40 marks

Score	**Level of knowledge**
<50 %	Inadequate knowledge
51-75%	Moderately adequate knowledge.
>75%	Adequate knowledge.

SECTION - D

The observational checklist had 25 items. The items were in the "yes" or "no" form. The score for yes is 'one' and no is 'zero'

Yes – 1 mark

No – 0 mark

Total – 25 marks

Score	**Level of Practice**
<50%	Poor practice
51-75%	Fair practice
>75%	Good practice

CONTENT VALIDITY

The content validity of the data collection and intervention tool was ascertained by opinion from the following field of expertise.

Neonatologist	- 1
Paediatrician	-1
Paediatric nursing expert	-3

Modifications were made as per the experts' suggestions and were incorporated in the tool.

ETHICAL CONSIDERATION

The ethical principles followed in the study was

I. Beneficence

1. Freedom from harm & discomfort

Participants were not subjected to unnecessary risks for harm as discomfort during the study period.

2. Protection from exploitation

Participants were assured that their participation or information they provided would not be used against them in any way.

II. Respect for human dignity

Participants were given full rights to ask questions, refuse to give information and also to withdraw from the study.

A written consent was obtained from the participants initially for their willingness to participate in the study.

III. Justice

The selection of study participants was completely based on research requirements. A full privacy was maintained throughout the process of data collection.

PILOT STUDY PROCEDURE

The pilot study was conducted after obtaining ethical committee clearance from International center for collaborative research. Written formal permission was obtained from the Principal, Omayal Achi College of Nursing and Chief Medical Officer, HVF hospital and Medical Director, KC hospital, Avadi during the month of June for a period of one week.

For Group A, the investigator selected 5 nurses in KC hospital, Avadi by using non probability convenient sampling and explained about the questionnaire and obtained written consent. Formal lecture cum demonstration on newborn resuscitation and assessment was given and reinforced through video show. After 3 days, the nurses were gathered in the conference hall and post test was administered by using structured questionnaire. Each sample took 20 min to answer the questions. And then their practice on newborn resuscitation and assessment was assessed by using observational checklist, which was based on modified AAP and WHO guidelines respectively.

For Group B, the investigator selected 5 nurses in HVF hospital, Avadi, by using non probability convenient sampling method and explained about the questionnaire and obtained written consent. The nurses were gathered in a separate room and questionnaire was administered. Each sample took 20 min to answer the questions, and their practice on newborn resuscitation and assessment was assessed by using observational checklist which was based on modified AAP & WHO guidelines respectively.

RELIABILITY

The reliability of the tool was established by test retest method. The reliability score was r = 0.88 which indicated that there was a high positive correlation.

The reliability for practice was established by inter-rater observer method. The reliability score was r = 0.98. The r value indicated a high positive correlation. Hence the tool was considered reliable to proceed with the main study.

PROCEDURE FOR DATA COLLECTION

A formal permission was obtained from the Principal, Omayal Achi College of Nursing and Ethical clearance was obtained from International Centre for Collaborative Research and written permission was obtained from honorary

secretary of Public Health Center, West Mambalam and Medical director of Madras Medical Mission, Mogappair.

The Research study was conducted in the month of June 2011. Self introduction about the Investigator and information regarding the nature of the study was explained to the selected samples so as to promote their full participation. The investigator obtained informed consent from the study participants and they were reassured regarding confidentiality of their scores. Privacy and Confidentiality was maintained throughout the data collection process and the data was collected for a period of four weeks.

The Investigator selected 60 samples in Madras Medical Mission and Public Health Center for participating in the study who fulfilled the selection criteria using non probability convenient sampling method.

Staff nurses working in Public Health Center, Mambalam were taken as Group A and were gathered in the conference hall and were seated comfortably. Lecture cum demonstration on newborn resuscitation and assessment, booklet was given and reinforced through video show and return demonstration.

As planned earlier the investigator conducted post test after a week. Staff nurses from Group A were gathered in the conference hall .The nurses were given clear explanation regarding the Questionnaire and structured questionnaires were administered. Each nurse took around 30 minutes to answer all questions. Post test for practice was assessed using the observational checklist which was based on modified AAP and WHO guidelines.

Staff nurses working in Madras Medical Mission were taken as Group B. They were gathered in lecture hall and were seated comfortably. The nurses were given clear explanation regarding the questionnaire and structured questionnaires were administered. Each nurse took around 20 minutes to answer all questions. Post

test for practice was assessed using observational checklist which is based on modified AAP and WHO guidelines. After a week, Lecture cum demonstration on newborn resuscitation and assessment, booklet was given for Group B and reinforced through video show and return demonstration.

PLAN FOR DATA ANALYSIS

Descriptive Statistics

1. Frequency and percentage distribution to analyze demographic variables of staff nurses.
2. Mean and standard deviation to assess the post intervention level of knowledge and practice among staff nurses in Group A and Group B.

Inferential Statistics

1. Unpaired ‘t’ test to assess the effectiveness of training module between the staff nurses in Group A and Group B.
2. Correlation co-efficient to find out the relationship between knowledge and practice among staff nurses in Group A and Group B.
3. Chi-square to find out the association of post intervention level of knowledge and practice with selected demographic variables.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data obtained from 60 staff nurses. Statistical analysis is a method for rendering quantitative information meaningful and intangible. This enables the researcher to summarize, organize, evaluate, interpret and communicate numeric information.

The data for the study grouped and analyzed as per the objectives set for the study. Data analysis includes both descriptive and inferential statistics.

ORGANISATION OF DATA

The data has been grouped, tabulated and organized below as follows.

SECTION A : Description of the demographic variables of staff nurses in Group A and Group B.

SECTION B : Assessment of the post intervention level of knowledge and practice among staff nurses on newborn resuscitation and assessment in Group A and Group B.

SECTION C : Effectiveness of training module on level of knowledge and practice among staff nurses.

SECTION D : Correlation between the post intervention level of knowledge and practice in Group A and Group B.

SECTION E : Association of post intervention level of knowledge and practice with selected demographic variables of staff nurses in Group A and Group B.

SECTION A: DESCRIPTION OF THE DEMOGRAPHIC VARIABLES OF STAFF NURSES IN GROUP A AND GROUP B.

Table 1(a) : Frequency and percentage distribution of demographic variables of the staff nurses in Group A and Group B with respect to age, educational qualification and total years of experience.

N = 60

Demographic Variables	Group A		Group B	
	No.	%	No.	%
Age of the nurse in years				
<20	1	3.33	0	0.00
21 - 25	26	86.67	27	90.00
26 - 30	2	6.67	3	10.00
>31	1	3.33	0	0.00
Educational Qualification				
ANM	2	6.67	0	0.00
GNM	11	36.67	13	43.33
B.Sc.(N)	16	53.33	14	46.67
Post B.Sc.(N)	1	3.33	3	10.00
Total years of experience				
<1 year	16	53.33	1	3.33
1 - 3 years	10	33.33	24	80.00
4 - 6 years	3	10.00	5	16.67
>6 years	1	3.33	0	0.00

Table 1(a) describes the frequency and percentage distribution of the demographic variables among Group A and Group B with respect to age, educational qualification and total years of experience.

With regard to Group A, majority 26(86.67%) were between the age group of 21 – 25 years, 16(53.33%) had done B.Sc. (N), 16(53.33%) had less than 1 year of experience. In Group B, majority 27(90%) were in the age group of 21 – 25 years, 14(46.67%) had done B.Sc. (N), 24(80%) had 1 - 3 years of experience.

Table 1(b) : Frequency and percentage distribution of demographic variables of the staff nurses in Group A and Group B with respect to number of times each procedure performed, any inservice training programme attended.

N = 60

Demographic Variables	Group A		Group B	
	No.	%	No.	%
Number of Times each procedure performed				
Newborn Resuscitation				
1 - 5 times	26	86.67	30	100.00
6 - 10 times	1	3.33	0	0.00
>10 times	3	10.00	0	0.00
Newborn Assessment				
1 - 5 times	22	73.33	30	100.00
6 - 10 times	5	16.67	0	0.00
>10 times	3	10.00	0	0.00
Inservice education/workshop/seminar attended				
Yes	14	46.67	7	23.33
No	16	53.33	23	76.67
If yes how many times attended				
Once	4	13.33	3	10.00
Twice	8	26.67	3	10.00
More than 3 times specify	2	6.67	1	3.33

Table 1(b) describes the frequency and percentage distribution of the demographic variables among Group A and Group B with respect to number of times each procedures performed, any inservice training programme attended.

With regard to Group A, 26(86.67%) done newborn resuscitation 1 – 5 times, 22(73.33%) had done new born assessment 1 – 5 times, 16(53.33%) had not attended education/workshop /seminar and 8(26.67%) had attended education/workshop/seminar twice and in the Group B, 30(100%) done newborn

resuscitation 1 – 5 times, 30(100%) had done new born assessment 1 – 5 times, 23(76.67%) had not attended education/workshop /seminar and 3(10%%) each had attended education/workshop/seminar once and twice respectively.

SECTION B: ASSESSMENT OF THE POST INTERVENTION LEVEL OF KNOWLEDGE AND PRACTICE AMONG STAFF NURSES ON NEWBORN RESUSCITATION AND ASSESSMENT IN GROUP A AND GROUP B.

Table 2 : Frequency and percentage distribution of post intervention level of knowledge on various aspects of new born resuscitation in Group A and Group B.

N = 60

Knowledge	Inadequate				Moderately Adequate				Adequate			
	Group A		Group B		Group A		Group B		Group A		Group B	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Meaning	3	10.0	24	80.0	10	33.33	6	20.0	17	56.67	0	0
Initial steps	7	23.33	22	73.33	6	20.0	4	13.33	17	56.67	4	13.33
Bag/Mask Ventilation	4	13.33	11	36.67	6	20.0	12	40.0	20	66.67	7	23.33
Chest Compression	5	16.67	13	43.33	4	13.33	10	33.33	21	70.0	7	23.33
Medication	2	6.67	5	16.67	5	16.67	12	40.0	23	76.67	13	43.33
Overall	**1**	**3.33**	**17**	**56.67**	**12**	**40.0**	**13**	**43.33**	**17**	**56.67**	**0**	**0**

Table 2 reveals the frequency and percentage distribution of post intervention level of knowledge on various aspects of newborn resuscitation in the Group A and Group B.

With regard to post intervention level of knowledge on meaning of newborn resuscitation majority 17(56.67%) had adequate knowledge, 17(56.67%) had adequate knowledge on initial steps, 20(66.67%) had adequate knowledge on bag/mask ventilation, 21(70%) had adequate knowledge on chest compression and 23(76.67%) had adequate knowledge on medication. The overall post intervention level of knowledge on newborn resuscitation showed that majority 17(56.67%) had adequate knowledge in Group A. And in Group B majority 24(80%) had inadequate knowledge on meaning of newborn resuscitation, 22(73.33%) had

inadequate knowledge on initial steps, 12(40%) had moderately adequate knowledge on bag/mask ventilation, 13(43.33%) had inadequate knowledge on chest compression and 13(43.33%) had adequate knowledge on medication. The overall post intervention level of knowledge on newborn resuscitation depicted that majority 17(56.67%) had inadequate knowledge.

Table 3 : Frequency and percentage distribution of post intervention level of knowledge on various aspects of new born assessment in Group A and Group B.

N = 60

Knowledge	Inadequate				Moderately Adequate				Adequate			
	Group A		Group B		Group A		Group B		Group A		Group B	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Immediate Assessment	5	16.67	3	10.0	8	26.67	10	33.33	17	56.67	17	56.67
Transitional Assessment.	0	0	0	0	5	16.67	25	83.33	25	83.33	5	16.67
Overall	**1**	**3.33**	**1**	**3.33**	**10**	**33.33**	**27**	**90.0**	**19**	**63.33**	**2**	**6.67**

Table 3 reveals the frequency and percentage distribution of post intervention level of knowledge on various aspects of newborn assessment in Group A and Group B.

With regard to post intervention level of knowledge on immediate assessment majority 17(56.67%) had adequate knowledge and 25(83.33%) had adequate knowledge on transitional assessment in Group A. The overall post intervention level of knowledge on newborn assessment showed that majority 19(63.33%) had adequate knowledge in Group A. And in Group B, the post intervention level of knowledge on immediate assessment majority 17(56.67%) had adequate knowledge and 25(83.33%) had moderately adequate knowledge on transitional assessment in Group B. The overall post intervention level of knowledge on newborn assessment showed that majority 27(90%) had moderately adequate knowledge in the Group B.

N = 60

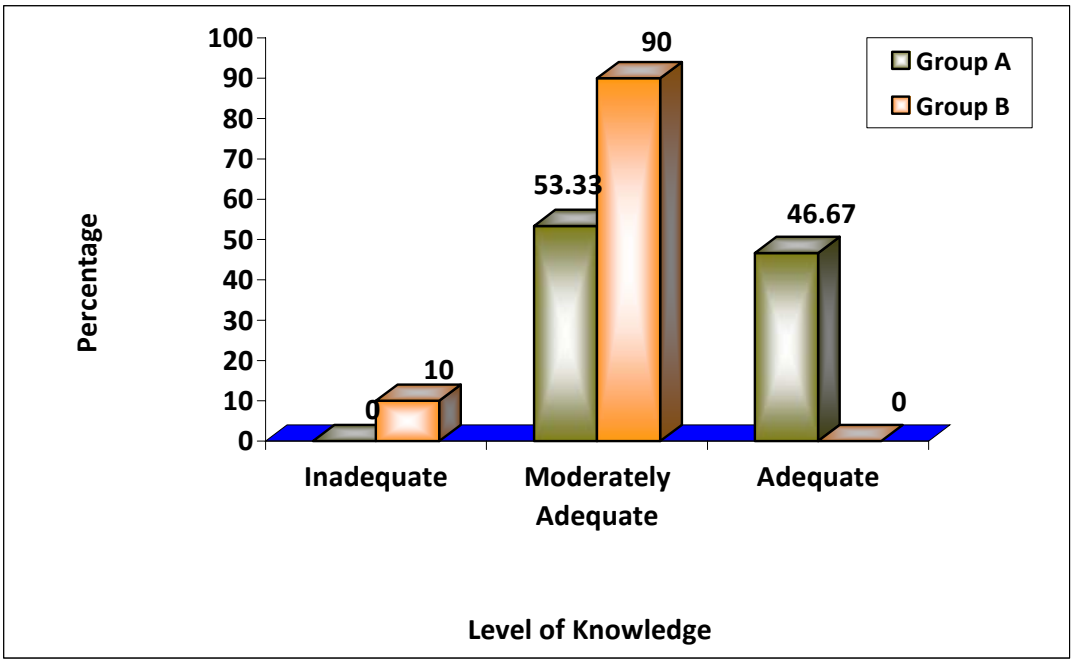


Fig.3: Percentage distribution of overall post intervention level of knowledge in Group A and Group B

Figure 3 depicts the percentage distribution of overall post intervention level of knowledge in Group A and Group B.

With regard to the post intervention level of knowledge in Group A 53.33% had moderately adequate knowledge and 46.67% had adequate knowledge on newborn resuscitation and assessment. In Group B majority 90% had moderately adequate knowledge on newborn resuscitation and assessment.

The administration of training module on newborn resuscitation and assessment had increased the post intervention level of knowledge in staff nurses. This was a well proven fact from previous research evidences that proper teaching programme enhanced knowledge among staff nurses.

N = 60

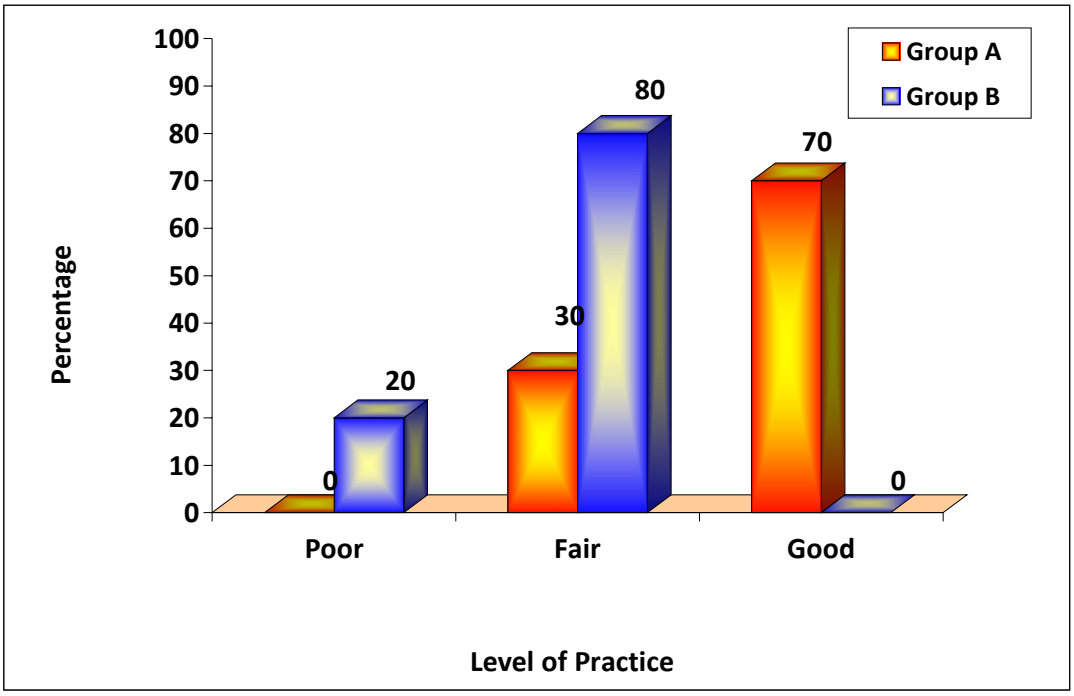


Fig.4: Percentage distribution of post intervention level of practice on newborn resuscitation and assessment in Group A and Group B.

Figure 4 depicts the percentage distribution of overall post intervention level of practice in Group A and Group B.

With regard to the post intervention level of practice in Group A 70% had good level of practice and 30% had fair level of practice on newborn resuscitation and assessment whereas in Group B majority 80% had fair level of practice on newborn resuscitation and assessment.

SECTION C : EFFECTIVENESS OF TRAINING MODULE ON LEVEL OF KNOWLEDGE AND PRACTICE AMONG STAFF NURSES IN GROUP A AND GROUP B.

Table 4 : Comparison of mean and standard deviation of post intervention level of knowledge among nurses in Group A and Group B.

N = 60

Post Test Knowledge	Mean	S.D	Unpaired 't' Value
Group A	30.37	4.48	t = 8.174***
Group B	19.43	1.43	p = 0.000, (S)

***p<0.001, S – Significant

Table 4 illustrates the comparison of mean and standard deviation of post intervention level of knowledge in Group A and Group B.

The comparison revealed that in Group A the post intervention mean score was 30.37 with S.D 4.48 and in Group B the post intervention mean score was 19.43 with S.D 1.43. The calculated 't' value of 8.174 was statistically highly significant at p<0.001 which clearly indicated that the training module given to the staff nurses had significantly improved their knowledge on newborn resuscitation and assessment in Group A.

The administration of training module on newborn resuscitation and assessment had improved the knowledge of the staff nurses in all aspects of newborn resuscitation and assessment. This showed the effectiveness of the intervention tool.

Table 5: Comparison of mean and standard deviation of post intervention level of practice among nurses in Group A and Group B.

N = 60

Post Test Practice	Mean	S.D	Unpaired 't' Value
Group A	19.52	1.42	t = 16.515***
Group B	13.47	1.33	p = 0.000, (S)

***p<0.001, S – Significant

Table 5 illustrates the comparison of mean and standard deviation of post intervention level of practice in Group A and Group B.

The comparison revealed that in Group A the post intervention mean score was 19.52 with S.D 1.42 and in Group B the post intervention mean score was 13.47 with S.D 1.33. The calculated 't' value of 16.515 was statistically highly significant at p<0.001 which clearly showed that the training module given to the staff nurses had significantly improved their practice level on newborn resuscitation and assessment in Group A.

When the training module was given, the staff nurses who were keen to learn along with their years of experience dealing with newborn found it easier to enhance their knowledge on newborn resuscitation and assessment.

SECTION D: CORRELATION BETWEEN THE POST INTERVENTION LEVEL OF KNOWLEDGE AND PRACTICE IN GROUP A AND GROUP B.

Table 6 : Correlation between post intervention level of knowledge and practice in Group A.

n = 30

Group A	Mean	S.D	'r' Value
Knowledge	30.37	4.48	r = 0.528**
Practice	19.43	1.43	p = 0.003, (S)

**p<0.01, S – Significant

Table 6 illustrates the correlation between post intervention level of knowledge and practice in Group A.

When correlating the post intervention level of knowledge and practice in the Group A the post intervention mean knowledge score was 30.37 with S.D 4.48 and the post intervention mean practice score was 19.43 with S.D 1.43. The calculated 'r' value of 0.528 showed a positive correlation between knowledge and practice which was statistically significant at p<0.01 level.

It showed that after the administration of training module on newborn resuscitation and assessment there was a moderate positive correlation between post intervention level of knowledge and practice.

It was a well proven fact from previous research evidences that gain in the knowledge of nurses improved the practice of the nurses.

Table 7: Correlation between post intervention knowledge and practice score in Group B.

n = 30

Group B	Mean	S.D	'r' Value
Knowledge	22.67	2.92	r = 0.148
Practice	13.47	1.33	p = 0.435, (N.S)

N.S – Not Significant

Table 7 illustrates the correlation between post intervention level of knowledge and practice in Group B.

When correlating the post intervention level of knowledge and practice in Group B the post intervention mean knowledge score was 22.67 with S.D 2.92 and the post intervention mean practice score was 13.47 with S.D 1.33. The calculated 'r' value of 0.148 showed a positive poor correlation between knowledge and practice which was statistically not significant.

SECTION E: ASSOCIATION OF POST INTERVENTION LEVEL OF KNOWLEDGE AND PRACTICE OF STAFF NURSES WITH SELECTED DEMOGRAPHIC VARIABLES IN GROUP A AND GROUP B.

Table 8 : Association of post intervention level of knowledge on newborn resuscitation and assessment with demographic variables in the Group A with respect to educational qualification

n = 30

Demographic Variables	Moderately Adequate		Adequate		Chi-Square
	No.	%	No.	%	
Educational Qualification					$\chi^2 = 22.969$ d,f = 3 p = 0.000 S***
ANM	2	6.7	0	0	
GNM	11	36.7	0	0	
B.Sc.(N)	2	6.7	14	46.7	
Post B.Sc.(N)	1	3.3	0	0	

***p<0.001, S – Significant, N.S – Not Significant

Table 8 reveals the association of post intervention level of knowledge on newborn resuscitation and assessment with demographic variables in Group A with respect to educational qualification.

In Group A there was a high statistical association with demographic variable of educational qualification and the other demographic variables had not shown any statistically significant association with the post intervention level of knowledge on newborn resuscitation and assessment among staff nurses in Group A.

Table 9: Association of post intervention level of practice on newborn resuscitation and assessment with demographic variables in Group A with respect to educational qualification.

n = 30

Demographic Variables	Fair		Good		Chi-Square
	No.	%	No.	%	
Educational Qualification					$\chi^2 = 11.034$ d,f = 3 p = 0.012 S*
ANM	1	3.3	1	3.3	
GNM	7	23.3	4	13.3	
B.Sc.(N)	1	3.3	15	50.0	
Post B.Sc.(N)	0	0	1	3.3	

*p<0.05, S – Significant, N.S – Not Significant

Table 9 reveals the association of post intervention level of practice on newborn resuscitation and assessment with demographic variables in Group A with respect to educational qualification.

In Group A the demographic variable educational qualification of the staff nurses had shown statistically significant association with their post intervention level of practice at p<0.05 level and the other demographic variables had not shown any statistically significant association with the post intervention level of practice on newborn resuscitation and assessment among staff nurses in Group A.

CHAPTER – V

DISCUSSION

This chapter discusses the findings of the study derived from the statistical analysis and its pertinence to the objectives set for the study and related literature of the study. The purpose of the study was to assess the effectiveness of training module on knowledge and practice regarding newborn resuscitation and assessment among staff nurses.

The findings of the study discussed were based on the objectives as stated.

The first objective was to assess the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.

Findings of the post intervention level of knowledge on newborn resuscitation and assessment revealed that, in Group A, 53.33% had moderately adequate knowledge and 46.67% had adequate knowledge, whereas in Group B majority 90% had moderately adequate knowledge and 10% had inadequate knowledge on newborn resuscitation and assessment.

The above findings were consistent with a pre experimental study conducted by **Durojaive L.O. Meara M. (2004)**[48] on improvement in resuscitation knowledge after a one day pediatric life support course among staff nurses in Sydney hospital. Responses to individual questions before and after course were analyzed and an overall test score was calculated. The result showed that there was a significant improvement in the knowledge of the group after the course with median test score increasing from 19 to a maximum of 22($P<0.001$).

Analysis of the post intervention level of practice on newborn resuscitation and assessment revealed that, in Group A, 70% had good practice level and 30%

had fair practice level, whereas in Group B 80% had fair level of practice and 20% had poor practice level on newborn resuscitation and assessment.

The above findings were consistent with the quasi experimental study conducted by **Amal Mohammed El-Dakhakhny.(2011)**[33] to evaluate the impact of educational program on newborn assessment among 60 nurses in maternal and child health units at Zagazig city, Egypt. A structured interview sheet and observational checklist were used to assess nurses' performance. It was found that total nurse's complete knowledge and practice score was poor before program implementation and improved at post test ant this result was highly significant. The study concluded that the nurse's performance significantly improved after program implementation.

Hence the hypothesis NH_1 stated earlier that "There is no significant difference between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B at $p<0.001$" was **rejected.**

The second objective was to compare the post intervention level of knowledge and practice on newborn resuscitation and assessment between staff nurses in Group A and Group B.

In Group A, the calculated 't' value was 8.174 which showed that there was statistically high significant improvement in the post intervention level of knowledge and practice at $p<0.001$ which clearly indicated that the training module given to the staff nurses had significantly improved their knowledge on newborn resuscitation and assessment than in Group B.

The above findings were consistent with the following study conducted by **Alexandra Osafo & Carl Bose .(2009)**[31] to evaluate the effectiveness of a strategy for teaching newborn resuscitation on health professionals at Ghana, West Africa. The median pretest and post test scores were 43% and 81% for nurses, 52% and

90% for nurse anesthetists. All groups of 271 professionals who completed the course showed significant improvement ($p<0.001$) in median post test scores. The study concluded that evidence based newborn resuscitation training adapted significantly improved knowledge of all groups of health professionals.

The post intervention level of practice in Group A, the calculated 't' value was 16.515 which was statistically highly significant at $p<0.001$ which clearly indicated that the training module given to the staff nurses had significantly improved their practice level on newborn resuscitation and assessment in Group A than Group B.

These findings of the study were consistent with the pre-experimental study conducted by **Carlo .W.A., et al .(2009)**[43] to evaluate the effectiveness of American Academy of Pediatrics Newborn Resuscitation Program in improving knowledge, skills and self-efficacy among 127 nurses working in low risk delivery clinics in USA. After training, written scores improved from 57% to 80%, performance scores improved from 74% to 90%. The study revealed that newborn resuscitation program training has the potential to substantially improve knowledge and skills on newborn resuscitation.

The third objective was to correlate the level of knowledge with practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.

In Group A, the calculated 'r' value was 0.528 which showed that there was a positive correlation between knowledge and practice which was statistically significant at $p<0.001$ level. This showed that when the knowledge of staff nurses on newborn resuscitation and assessment increases their practice level also increases.

The above findings were consistent with the following study conducted by **Zafar, S., et al .(2009)** [93], a cross – sectional survey to evaluate the use of

structured training program in emergency care among 120 health workers in all regions of Pakistan. 1123 resuscitation attempts were documented and received from 63 of the 120 participants. 24% of documented cases were received from nurses. Skills used to serve the airway; breathing and circulation were used in 58%, 82%, and 73% of resuscitated children. The study concluded that, the analysis provided some evidence that the skills taught are used by the trained health workers and their practice is significantly improved.

In Group A, the calculated 'r' value was 0.148, which showed a positive correlation between knowledge and practice on newborn resuscitation and assessment among staff nurses but was not statistically significant.

Hence the null hypothesis NH_2 stated earlier that "There is no significant correlation between the post intervention level of knowledge and practice regarding training module on newborn resuscitation and assessment among staff nurses in Group A and Group B at $p<0.001$." was **rejected.**

The fourth objective of the study was to associate the knowledge and practice scores on newborn resuscitation and assessment with selected demographic variables of staff nurses in Group A and Group B.

In Group A, there was a high statistical significant association with selected demographic variable of educational qualification.

Hence the null hypothesis NH_3 stated there is no significant association between post intervention level of knowledge and practice scores on newborn resuscitation and assessment among staff nurses with selected demographic variables in **Group A** was **rejected.**

The finding of the study was supported by a pre-experimental study conducted by **Elizabeth, M. Mcclure., et al. (2005)**[49] to evaluate the educational impact of newborn care among 115 nurses in Global network for women and

children health research, Zambia. The post test score for knowledge was increased to 89% from 68% and practice was increased to 81% from 65% where $p<0.05$. The study concluded that there is significant improvement of knowledge and practice after essential newborn care training.

In Group B there was no high statistical significant association with selected demographic variables like age, educational qualification, years of experience, number of times each procedures performed, any inservice training programmes attended.

Hence the null hypothesis NH_3 stated earlier that there is no significant association between post intervention level of knowledge and practice scores on newborn resuscitation and assessment among staff nurses with selected demographic variables in **Group B** was **accepted.**

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This chapter presents the summary, conclusion, implications, recommendations and limitations of the study based on the selected objectives.

SUMMARY

Nurses play a crucial role in resuscitating the newborn and hold the necessary skills and expertise to do so. To implement a successful resuscitation, the nurse needs to have improved knowledge and practice in clinical area as well as to be self-critical and serve as a good role model. In order to reduce the early neonatal mortality rate, effective skill and knowledge are very essential.

Training modules have evolved into a comprehensive tool to direct the care and management of newborn in the delivery room. It is very mandatory to all nurses to update their knowledge and practice based on current guidelines. A training module on newborn resuscitation and assessment for staff nurses is very essential to articulate situations in which the nurse provides quality care to newborns. When training modules are used by everyone it is easy to analyze whether the approaches laid down are scientifically and statistically effective.

The purpose of the study was to assess the effectiveness of training module on knowledge and practice regarding newborn resuscitation and assessment among staff nurses.

The objectives of the study were

1. To assess the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.

2. To compare the post intervention level of knowledge and practice on newborn resuscitation and assessment between staff nurses in Group A and Group B.
3. To correlate the post intervention level of knowledge with practice on newborn resuscitation and assessment among staff nurses in Group A and Group B.
4. To associate the knowledge and practice scores on newborn resuscitation and assessment with selected demographic variables of staff nurses in Group A and Group B.

The study was based on the assumptions that

1. Staff nurses may have some knowledge and practice on newborn resuscitation and assessment.
2. Imparting information on newborn resuscitation and assessment may enhance level of knowledge and practice among staff nurses.
3. Adequate information regarding newborn resuscitation and assessment provided to the staff nurses may help to provide expertise care to the newborn.
4. Providing information regarding newborn resuscitation and assessment may enhance the standards of nursing practice.

The null hypotheses formulated were

NH_1: There is no significant difference between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B at $p<0.001$.

NH_2: There is no significant correlation between the post intervention level of knowledge and practice on newborn resuscitation and assessment among staff nurses in Group A and Group B at $p<0.001$.

NH_3: There is no significant association between the post intervention level of knowledge and practice on newborn resuscitation and assessment among

staff nurses with the selected demographic variables in Group A and Group B at $p<0.001$.

The review of literature was derived from the primary and secondary sources that formed the basis for selection of the problem, formation of tool and conceptual framework. The conceptual framework was based on Peplau's interpersonal relationship model and provides the comprehensive framework which had the phases of orientation, identification, exploitation and resolution.

Research design used in the study was quasi experimental non equivalent control group post test only design. The study was conducted among staff nurses working at Public Health Center and Madras Medical Mission, Chennai. The sample size was 60 staff nurses, 30 in Group A and 30 in Group B who were assigned by non probability convenience sampling technique.

Tool used for data collection procedure comprised of 4 sections, section A comprised of demographic variables and section B comprised of intervention tool, section C comprised of structured questionnaire and section D comprised of observational checklist based on modified AAP and WHO guidelines.

The Medical and Nursing experts validated the tool. The pilot study was conducted at KC multispeciality hospitals, HVF hospital, Avadi. The reliability of the tool was established by test retest method $r = 0.88$. The reliability for practice was established by inter-rater observer method $r = 0.98$. The pilot study was found to be practicable and feasible to proceed with main study. The findings showed that the tool was highly reliable to proceed with the main study.

The ethical aspect of research was maintained throughout the study by obtaining ethical committee clearance from the ICCR, formal permission from the authorities and written consent from the staff nurses who participated in the study.

The information collected from the staff nurses was kept confidential and it was used only for the research purpose.

The findings of the study were

The data was analyzed using descriptive and inferential statistics. Interpretation and discussion was done based on the objectives of the study, null hypotheses, conceptual framework and research studies from literature review.

The post intervention level of knowledge and practice in Group A showed that 53.33% had moderately adequate knowledge and 46.67% had adequate knowledge and 70% had good level of practice and 30% had fair level of practice on newborn resuscitation and assessment. In Group B majority 90% had moderately adequate knowledge and 80% had fair level of practice on newborn resuscitation and assessment.

The comparison revealed that, in Group A the post intervention knowledge mean score was 30.37 with S.D 4.48 and the post intervention practice mean score was 19.52 with S.D 1.42 and in Group B the post intervention knowledge mean score was 19.43 with S.D 1.43 and the post intervention practice mean score was 13.47 with S.D 1.33. The calculated ‘t’ value of 8.174 for knowledge was statistically highly significant at $p<0.001$ which clearly indicated that the training module given to the staff nurses had significantly improved their knowledge on newborn resuscitation and newborn assessment in Group A. The calculated‘t’ value of 16.515 for practice was statistically highly significant at $p<0.001$ which clearly showed that the training module given to the staff nurses had significantly improved their practice level on newborn resuscitation and newborn assessment in Group A.

There was a high statistical significant association with selected demographic variable of educational qualification in Group A. And in Group B there was no high statistical significant association with selected demographic

variables like age, educational qualification, years of experience, number of times each procedures performed, any inservice training programmes attended.

CONCLUSION

The present study aims to assess the effectiveness of training module on knowledge and practice regarding newborn resuscitation and assessment among staff nurses working in selected hospitals. From the findings of the data analysis it is clear that the training module has an effect on enhancing the knowledge and practice among staff nurses. Hence, the training module on newborn resuscitation and assessment can be utilized by nurses to prevent early neonatal complications and mortality.

IMPLICATIONS

The investigator has drawn the following implications from the study which was of vital concern for nursing practice, nursing education, nursing administration and recommendation for nursing research**.**

Nursing Practice

Nurses working in newborn unit should have commitment to attend any form of education programme to provide quality nursing care and update their knowledge. Nurses needs to be equipped with knowledge and practice on newborn resuscitation and assessment. They can update their knowledge by attending continuing education programme, seminar, workshops, symposium and by in service education.

Demonstration on steps of resuscitation and assessment of newborn to all staff nurses will improve the quality of nursing care and helps in preventing complications in the early neonatal period. Hospital policies should be reviewed to enhance inservice programmes on resuscitation techniques.

Nursing Education

Nursing education should offer short term continuing nursing education on newborn resuscitation and assessment. An awareness need to be created on importance of resuscitation techniques and thorough newborn assessment so as to prevent complications.

Teaching strategies such as demonstrations, video shows, procedure manuals and computer assisted interventions on newborn resuscitation techniques and assessment can be incorporated in the curriculum.

Nursing Administration

The nurse administrator should make arrangement for training the staff nurses on current newborn resuscitation and assessment techniques. The nurse administrator may help in organising well with procedure manuals, textbooks and journals on newborn resuscitation and assessment to reduce the early neonatal complications. The Nurse administrator can take initiation in organizing continuing nursing education program based on current guidelines.

Nursing Research

The nurse researcher can encourage clinical nurses to apply the findings in their daily nursing care. The nurse can promote more research with regard to knowledge and practice on newborn resuscitation and assessment.

1. The findings need to be disseminated through conference, seminars and published in professional journals, and World Wide Web will make the application of the research findings to be effectively used in practice.
2. The findings of the research study will help in building and strengthening the body of knowledge in the discipline of nursing.

RECOMMENDATIONS

1. The researcher recommends the use of training module in Public Health Center and Madras Medical Mission.

2. The researcher recommends the utilization of training module by the students of Omayal Achi College of Nursing and nurses of their affiliated institution.
3. The study can be replicated with a large number of samples in different setting for better generalization.

LIMITATIONS

1. The investigator found difficulty in obtaining related Indian literatures.
2. The investigator found difficulty to gather staff nurses all at a time to conduct post test.

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APPENDIX – F

SECTION – A

DEMOGRAPHIC DATA:

1. Age of the nurse in years

a. <20
b. 21-25
c. 26-30
d. >31

2. Educational qualification

a) ANM
b) GNM
c) BSC (N)
d) Post BSC (N)

3. Total years of experience in nursing service

a. < 1 year
b. 1-3 years
c. 4-6 years
d. > 6 years

4. Number of times each procedure performed by the nurse during the service?

a. <u>New born resuscitation:</u>

i. 1-5 times
ii. 6-10 times
iii. >10 times

b. <u>New born assessment</u>

i. 1-5 times

ii. 6-10 times

iii. >10 times

5. In service education/ workshop/seminar attended

1. Yes
2. No

5.1. If yes how many times attended

a. Once

b. Twice

c. More than 3 times specify

SECTION – B

Read the questions carefully and choose the best option

A. NEW BORN RESUSCITATION

I. Meaning of resuscitation

1. During intra life fetal lung are filled with lung fluid hence
   a. Receives 10-15% of cardiac output
   b. Receives 16-20% of cardiac output
   c. Receives 21-25% of cardiac output
   d. Receives 26-30% of cardiac output
2. The amount of lung fluid squeezed out through nose and mouth during vaginal delivery is
   a. 2/3rd of lung fluid
   b. 1/3rd of lung fluid
   c. 1/4th of lung fluid
   d. 2/4th of lung fluid
3. Asphyxia refers to
   a. Deficient supply of carbon dioxide.
   b. Failure to remove carbon dioxide
   c. Deficient supply of oxygen to the body.
   d. Metabolic acidosis.
4. The tidal volume required by the new born per kg body weight
   a. 4-7 ml
   b. 5-8 ml
   c. 6-9 ml
   d. 7-10 ml
5. Immediately after birth baby loses temperature by
   a. Radiation
   b. Conduction
   c. Convection
   d. Evaporation

II. Initial steps of resuscitation

1. When a baby born with meconium stained is not crying, immediately the following to be done

a. Flicking

b. Rubbing

c. Suction of the mouth, nose

d. Suction of the nose, mouth

2. A new born baby establishes normal respiration within

a. 10-20 sec

b. 20-30 sec

c. 30-40 sec

d. 40-50 sec

3. When meconium stained liquor is present is suction should be done immediately

a. As head is delivered

b. As head and shoulder is delivered

c. As chest is delivered

d. After complete delivery of the baby

4. Tactile stimulation may initiate spontaneous respiration in new born those who are experiencing

a. Bradycardia

b. Tachycardia

c. Secondary apnea

d. Primary apnea

5. Cutaneous stimulation is done because

a. Increased respiratory rate

b. Decreased cardiac output

c. There will be peripheral vasodilatation

d. There will be peripheral vasoconstriction

III. Bag/mask ventilation

1. The baby should be placed in the warmer as

a. Supine or lying on the side with head neutral or slightly extended
b. 45 extended
c. Flexed
d. Turned to side

2. The following is used to extend neck and open air way during bag/mask ventilation

a. A pillow to be kept under baby's head
b. Place a small roll or towel under the shoulder
c. Keep a towel under the neck
d. Keep towel under the back

3. Resuscitation bags used for neonates should not be bigger than

a. 450 ml
b. 550 ml
c. 650 ml
d. 750 ml

4. The ventilation should be given at the rate of

a. 20-40 breaths/min
b. 40-60 breaths/min
c. 60-80 breaths/min
d. 80-100 breaths/min

5. Evaluate the infant for every 30 seconds by simultaneously observing the

a. Temperature, respiration, color
b. Heart rate, respiration
c. Color, heart rate, temperature
d. Muscle tone, heart rate, respiration

IV. CHEST COMPRESSION

1. The ratio of compression to ventilation is
   a. 1:1
   b. 2:1
   c. 3:1
   d. 4:1
2. Compression should be delivered on
   a. Middle of the sternum
   b. Lower 3rd of the sternum
   c. Tip of the sternum
   d. Upper 3rd of the sternum
3. The chest compression continued till spontaneous heart rate is greater than or equals to
   a. 60 beats/min
   b. 80 beats/min
   c. 100 beats/min
   d. 120 beats/min
4. Appropriate inflation pressure can be more reliably read by
   a. Specific manometer reading
   b. Heart rate reading
   c. Visible chest expansion
   d. Flow of oxygen
5. Care to be taken while chest compression because
   a. Fracture, pneumothorax ,laceration of liver is possible
   b. May result in damage to spine
   c. May not be effective compression
   d. May press the heart

V. MEDICATION

1. Resuscitation kit should contain emergency drug like
    a. Epinephrine, sodium bi carbonate
    b. Epinephrine, nalaxone
    c. Sodium bi carbonate, nalaxone
    d. Epinephrine, sodium bi carbonate, normal saline and nalaxone.
2. Administration of epinephrine is indicated, when the heart rate remains less than
    a. Less than 100 beats/min
    b. Less than 80 beats/min
    c. Less than 60 beats/min
    d. Less than 40 beats/min
3. Dopamine is used in
    a. Narcotic respiratory depression
    b. Persisting hypotension
    c. Metabolic acidodis
    d. Persisting hypertension
4. Sodium bi carbonate is administered through infusion at a dose of
    a. 10 MEq/kg
    b. 8 MEq/kg
    c. 5 MEq/kg
    d. 2 MEq/kg
5. Epinephrine is used in
    a. 1:100
    b. 1:1000
    c. 1:10000
    d. 1:100000

B. NEWBORN ASSESSMENT:

i. Immediate newborn assessment:

1. The first step in thermal protection for the newborn is
   a. Drying the baby thoroughly immediately after birth.
   b. Drying the baby thoroughly after the cord has been cut.
   c. Covering the baby with a clean, dry cloth immediately after birth.
   d. Covering the baby with a clean, dry cloth after the cord has been cut.
2. Immediate care for a newborn includes
   a. Skin to skin contact followed by placing the baby in a warming incubator.
   b. Drying the baby, removing the wet cloth, and covering the baby with a clean, dry cloth.
   c. Stimulating the baby by slapping the soles of the baby's feet.
   d. Deep suctioning of the airway to remove mucus.
3. The following can contribute to hypothermia in newborns
   a. The baby is not dried thoroughly immediately after birth.
   b. The baby is bathed immediately after birth.
   c. The baby is dried and placed in skin to skin contact with the mother.
   d. The baby is placed in an incubator.
4. To maintain the newborn's axillary temperature between 36.5C to 37.5C it is important to
   a. Place the baby in an incubator
   b. Bath the baby in warm water immediately after birth.
   c. Rub the baby vigorously with a blanket.
   d. Cover the baby's head, place the baby in skin to skin contact on the mother's chest and cover with a blanket.
5. The following Apgar score indicates that the newborn is having severe distress
   a. 0-3
   b. 4-6
   c. 7-10

d. 10-12

II. **Transitional assessment**

1. The normal head circumference of the newborn is
   a. 31-33 cm
   b. 33-35 cm
   c. 36-38 cm
   d. >38 cm
2. The normal heart rate of newborn is
   a. 72-78 beats/min
   b. 100-110 beats/min
   c. 120-160 beats/min
   d. 170-200 beats/min
3. The normal length of the newborn is
   a. 35-45 cm
   b. 45-55 cm
   c. 55-65 cm
   d. 65-75 cm
4. The scale used to test the neuromuscular component of gestational age of newborn is
   a. Denver developmental assessment scale
   b. Ballard Dubowitz scale
   c. Apgar scale
   d. Bayley1 infant assessment scale
5. The normal chest circumference of the newborn is
   a. 31-33 cm
   b. 33-35 cm
   c. 35-37 cm
   d. >37 cm

6. The correct landmark to check the head circumference is
    a. Frontal to occipital area above the ears.
    b. Frontal to occipital area below the ears.
    c. Occipital to coronal area above the ears.
    d. Occipital to sagital area.
7. Moro reflex disappears at
    a. 2 months of age
    b. 4 months of age
    c. 6 months of age
    d. 1 year of age
8. The shape of the anterior fontanel is
    a. Rectangle
    b. Triangle
    c. Diamond
    d. Circular
9. Which breathe sound is considered to be abnormal and should be reported early to the paediatrician?
    a. Crackles
    b. Wheeze
    c. Stridor
    d. Cheyne-stoke’s breathing
10. Babinski reflex disappears at
    a. 3 months
    b. 6 months
    c. 1 year
    d. 2 year

LIST OF EXPERTS FOR CONTENT VALIDITY

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2. **Mrs. S. Vasantha Kumari, M.Sc.(N), Ph.D.(N),**
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3. **Mr. S. Manoharan, M.Sc.(N),**
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